

**City University of Hong Kong
Course Syllabus**

**offered by Department of Systems Engineering
with effect from Semester A 2024 / 25**

Part I Course Overview

Course Title:	Semiconductor Manufacturing
Course Code:	SYE8206
Course Duration:	One Semester
Credit Units:	3
Level:	R8
Medium of Instruction:	English
Medium of Assessment:	English
Prerequisites: (Course Code and Title)	Nil
Precursors: (Course Code and Title)	Nil
Equivalent Courses: (Course Code and Title)	ADSE8206 Semiconductor Manufacturing (offered until 2023/24)
Exclusive Courses: (Course Code and Title)	Nil

Part II Course Details

1. Abstract

In the era of big data, customers have a growing demand for higher performance consumer electronic products. The continual advancement in semiconductor manufacturing is the key to ensuring the capacity for electronic information processing and data storage. The course aims to provide students with a broad overview of modern semiconductor manufacturing and management in consumer electronic products. This course is suitable for students from different backgrounds. We will cover basic operation principles for semiconductor devices and technological details for the fabrication processes of semiconductor devices. Based on these discussions, the management in the semiconductor business will be discussed in the case studies of the renewal and transformation at big semiconductor companies, such as Samsung, TSMC, and Intel.

2. Course Intended Learning Outcomes (CILOs)

No.	CILOs	Weighting (if applicable)	Discovery-enriched curriculum related learning outcomes		
			A1	A2	A3
1.	Have a clear understanding of the operation principles for semiconductor integrated circuits.	20%		✓	✓
2.	Can elaborate the main technologies in semiconductor manufacturing process.	50%		✓	✓
3.	Can get an overview of the renewal and transformation management in semiconductor companies.	30%	✓		✓
		100%			

A1: Attitude

Develop an attitude of discovery/innovation/creativity, as demonstrated by students possessing a strong sense of curiosity, asking questions actively, challenging assumptions or engaging in inquiry together with teachers.

A2: Ability

Develop the ability/skill needed to discover/innovate/create, as demonstrated by students possessing critical thinking skills to assess ideas, acquiring research skills, synthesizing knowledge across disciplines or applying academic knowledge to self-life problems.

A3: Accomplishments

Demonstrate accomplishment of discovery/innovation/creativity through producing /constructing creative works/new artefacts, effective solutions to real-life problems or new processes.

3. Learning and Teaching Activities (LTAs)

LTA	Brief Description	CILO No.			Hours/week (if applicable)
		1	2	3	
Lectures	The lectures will follow the chapters in the textbook	✓	✓	✓	3hrs/wk (for 10 wks)
Presentation and Tests	Students will give presentations on topics related to the course. Tests will also be conducted.	✓	✓	✓	3hrs/wk (for 3 wks)

4. Assessment Tasks/Activities (ATs)

Assessment Tasks/Activities	CILO No.			Weighting	Remarks
	1	2	3		
Continuous Assessment: <u>40 %</u>					
Presentation	✓	✓	✓	30 %	
Assignments (min.:3) -May include homework, tutorial exercise, project/mini-project, presentation.	✓	✓	✓	10 %	
Examination: <u>60 %</u> (duration: 2 hrs , if applicable)					
Examination	✓	✓	✓	60 %	
				100%	

To pass the course, students are required to achieve at least 30% in continuous assessment and 30% in the examination.

5. Assessment Rubrics

Applicable to students admitted before Semester A 2022/23

Assessment Task	Criterion	Excellent (A+, A, A-)	Good (B+, B, B-)	Fair (C+, C, C-)	Marginal (D)	Failure (F)
1. Continuous Assessment	Achievements in CILOs	High	Significant	Moderate	Basic	Not even reaching marginal levels
2. Examination	Achievements in CILOs	High	Significant	Moderate	Basic	Not even reaching marginal levels

Applicable to students admitted in Semester A 2022/23 and thereafter

Assessment Task	Criterion	Excellent (A+, A, A-)	Good (B+, B)	Marginal (B-, C+, C)	Failure (F)
1. Continuous Assessment	Achievements in CILOs	High	Moderate	Basic	Not even reaching marginal level
2. Examination	Achievements in CILOs	High	Moderate	Basic	Not even reaching marginal level

Part III Other Information (more details can be provided separately in the teaching plan)

1. Keyword Syllabus

(An indication of the key topics of the course.)

- Semiconductor materials
- Operation of semiconductor devices
- Process Technology
- Additive Processes, including thermal oxidation of silicon, Physical Vapor Deposition (PVD), Chemical Vapor Deposition (CVD), and electrochemical deposition.
- Lithography
- Subtractive Processes, including wet etching and dry etching.
- Processing of Contacts and Interconnects
- Assembly and packaging technology
- Dynamic techno-management capability
- Renewal and transformation of semiconductor companies, case studies including TSMC, Samsung, and Intel.

2. Reading List

2.1 Compulsory Readings

1.	Guide to Semiconductor Engineering, Jerzy Ruzyllo.
2.	Thin-Film Deposition: Principles and Practice, Donald L. Smith

2.2 Additional Readings

1.	Thin Film Processes, John L. Vossen
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